Evolutionary Acquisition In Action

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16 May 07

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Agenda

- **What is the Ballistic Missile Defense System?**
  - Technical description
  - What We've Done
- **Capability Based Acquisition**
  - Why, How and vs. "Traditional" Acquisition
- **MDA Knowledge Points**
  - Why, What and How
- **Implementation: Acquisition Management Framework**
- **So What? Transition and Transfer**

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Integrated Ballistic Missile Defense System

Sensors

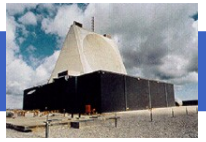
Defense Support Program

Space Tracking And Surveillance System

Sea-Based Radars

Forward-Based Radar With Adjunct SensorX-Band Radar

Midcourse Radar



Early Warning Radar

Boost Defense Segment

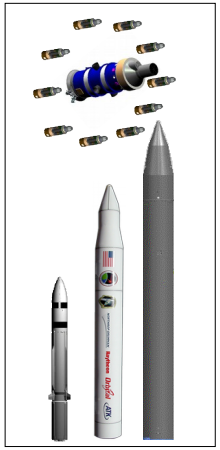
Midcourse Defense Segment

Terminal Defense Segment

Airborne Laser

Kinetic Energy Booster

Aegis Ballistic Missile Defense / Standard Missile-3



Multiple Kill Vehicle

Ground-Based Midcourse Defense

Terminal High Altitude Area Defense

Sea-Based Terminal

Patriot Advanced Capability -3

Command, Control, Battle Management & Communicatio

NMCC USSTRATCOM USNORTHCOM USPACOM EUCOM CENTCOM

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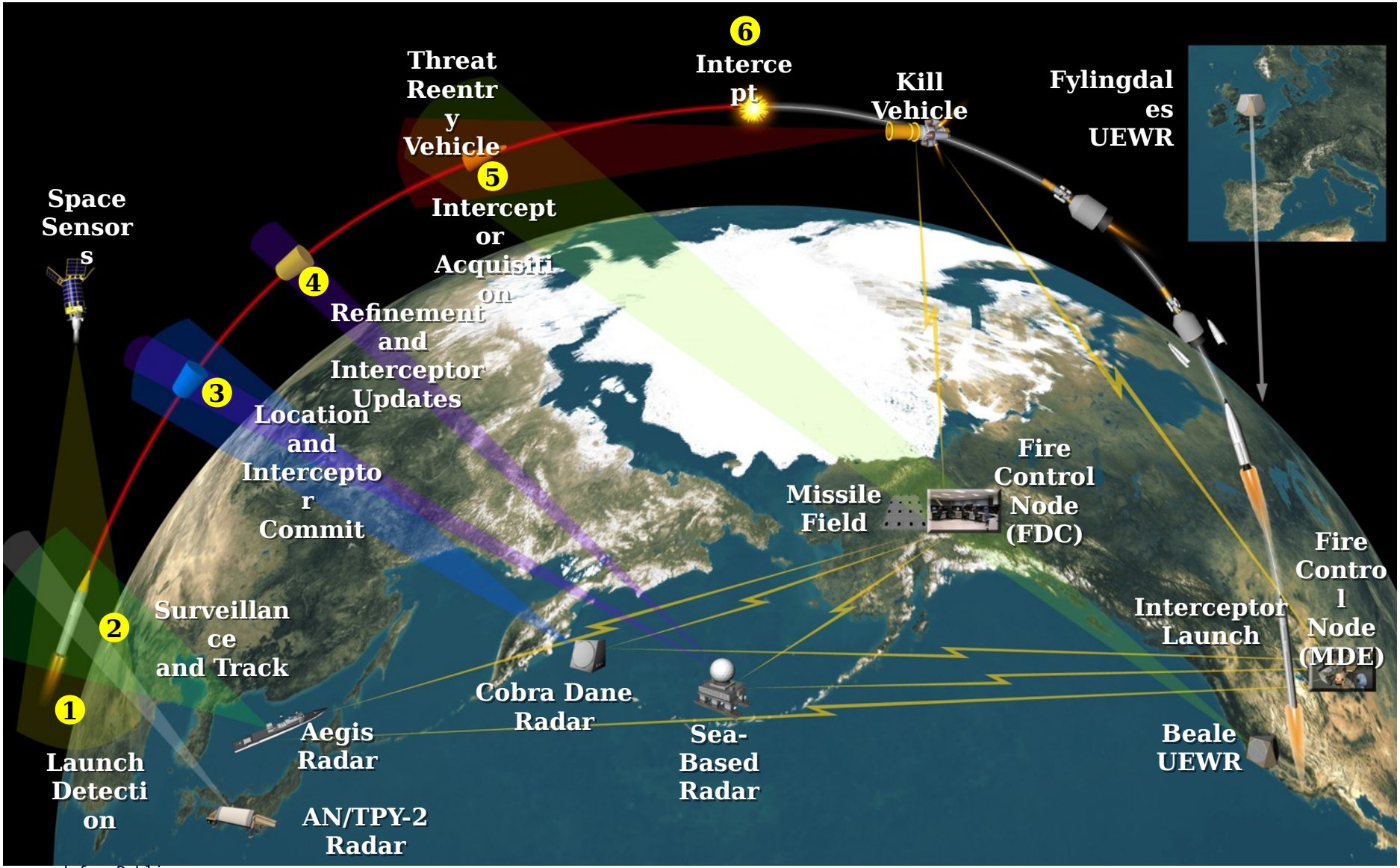
An Integrated Approach To Ballistic Missile Defense



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MDA Status FY 2002- FY 2004

- Prior to MDA, in the Ballistic Missile Defense Organization (BMDO), individual elements were essentially independent “stovepipe” systems
- MDA stood up 2 Jan 02 with implementation guidelines to develop a single integrated system
- Initial MDA focus was development of BMDS Test Bed
- President briefed in Aug 02 on proposed evolutionary missile defense plan
- No mid and long-range capability existed in Jun 04
- MDA focus: fielding of an initial capability

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Unprecedented Pace of Fielding

- **Since Jun 04, we have:**
  - Established two missile fields in Alaska and converted another in California – emplacing 17 Ground-Based Interceptors
  - Modified 16 AEGIS ships for long-range surveillance and track including 3 cruisers and 4 destroyers capable of launching SM-3s
  - Taken delivery of 19 SM-3 interceptors
  - Integrated and flight tested radars in Alaska and California
  - Delivered and integrated a forward-based transportable radar in Japan
  - Tested and deployed the Sea-Based X-Band radar to Alaska
  - Upgraded and tested the Fylingdales radar in the United Kingdom
  - Built Command, Control and Battle Management capabilities in Hawaii, Colorado, Nebraska, Washington DC, and the United Kingdom

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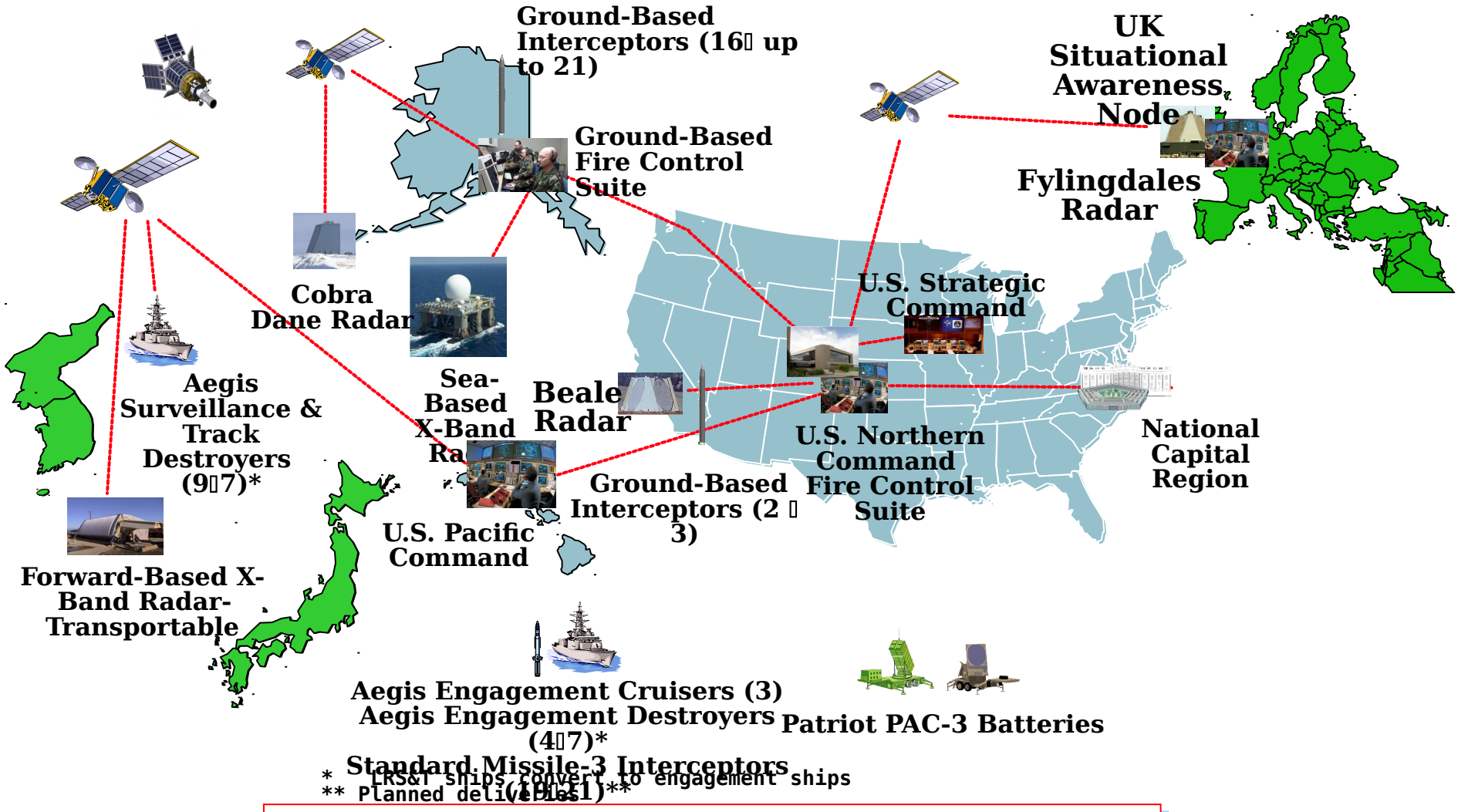
System Configuration
End April 2007 – End 2007



* LRS&T ships convert to engagement ships
** Planned deliveries

None Of This BMD Capability Existed In June 2004

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Direction for MDA's Use Of Capability-Based Acquisition

- **January 2002 – SecDef Missile Defense Program Direction**
  - Establish a single program to develop an integrated system under a newly titled Missile Defense Agency
  - Apply a capability-based requirements process for missile defense

- **GMD, Aegis BMD, ABL, THAAD, SBIRS-Low / STSS, PAC-3 transferred from Services to MDA**
  - Operational Requirements Documents (ORDs) were cancelled (except PAC -3)
  - Capability-based acquisition applied

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“r”equirements Process Evolves Over Past Five Years

- **Replaced Traditional, Cold War Model Defining Specific Threats**
  - Mission area approach (“System” = Ballistic Missile Defense System)
  - Physics-based definition of potential capability of offensive missiles
- **Initial Capability Standards**
  - BMDS specification (initially derived from elements)
- **User Participation (STRATCOM Engagement)**
  - First PCL in 2006, updated in 2007
  - Warfighter Involvement Process (WIP)
  - Service interaction (BoDs, Liaison Groups, etc)
- **Capability Trades**
  - Focused initially on near term vs. long term
  - All components in play now to optimize entire BMDS “portfolio”
  - Focus on Capabilities that can be delivered (near term and evolution for long term)

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Why Capability-Based Acquisition

- **Cannot predict with certainty what nation(s) or non-state actors will pose threats to U.S. interests or those of our allies and friends**
- **Need a flexible strategy to exploit technological opportunities and place capability "in play" sooner**
- **Focus is on adding capabilities with demonstrated military utility, rather than meeting requirements often defined years earlier**
- **Harmonize capability "requirements" with balance "in the check book"**

Traditional Threat-Based Acquisition Does Not Effectively Address the Above

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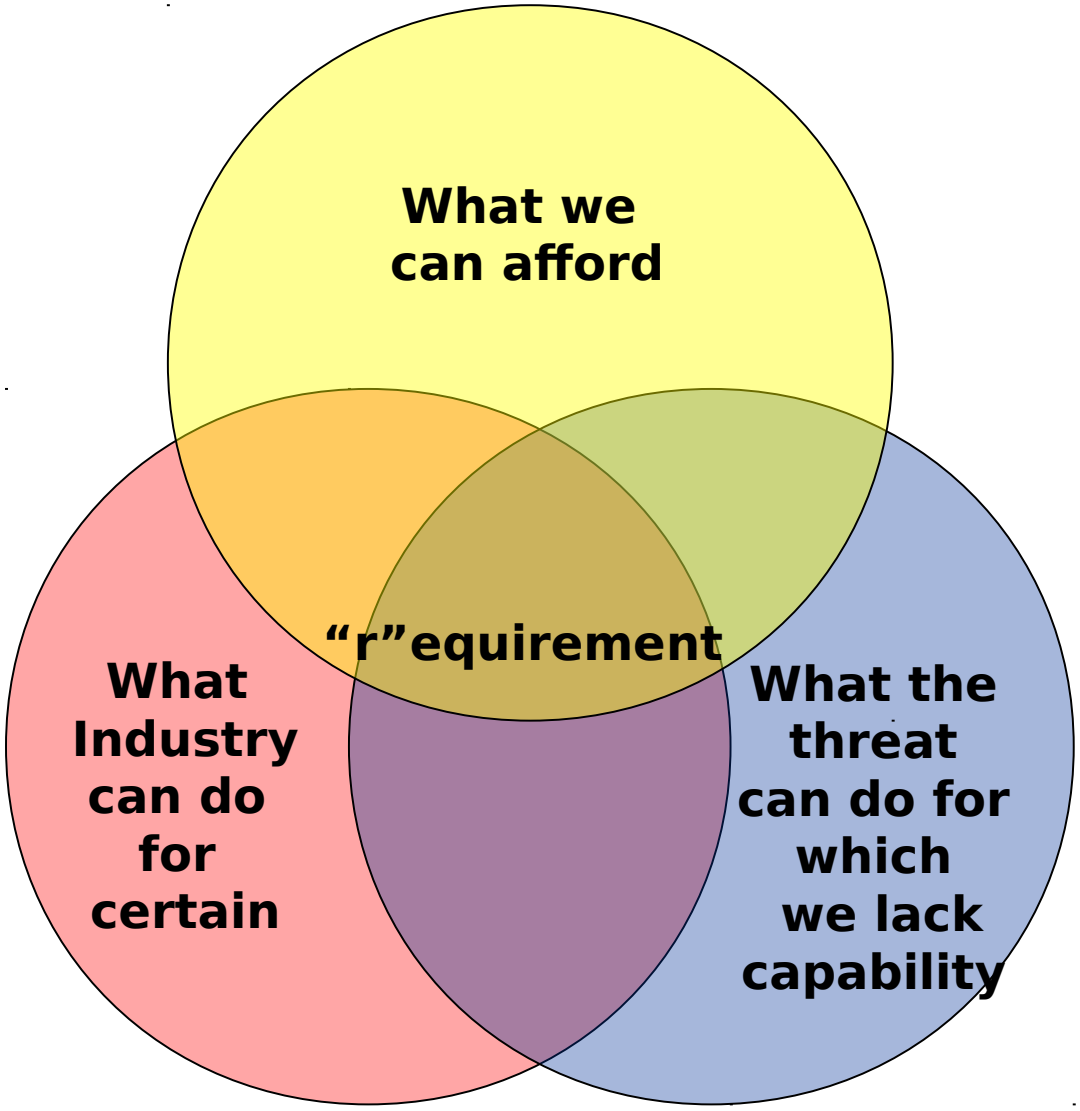
Capability-Based Acquisition



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Capability-Based Acquisition Management
Traditional Threat-Based Acquisition Vs. Capability-Based Acquisition

Threat-Based	Capability-Based
•Assumes accurate knowledge of future threat	•Up-front acknowledgement that specifics of future threat are unknown, but general characteristics are
•Relies on often optimistic promises of performance, cost and schedule that's "achievable"	•Emphasizes useful existing technology over a more results-based approach
•User views requirement as one opportunity to get the ideal system	•Willingness to accept early military utility through expanded continuous spiral development
•Fiscally trades are often outside the program	• Fiscal trades are within our portfolio
•Once approved, the program is virtually unstoppable	•Incremental commitments

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Some Implications of Capability-Based Approach

- **Robust technology investment**
  - Aimed at filling gaps
  - Carried to higher maturity level (TRL 6 or 7) before entering development
  - Solid strategy for transition to development
- **Spiral development**
  - Event-based improvements
  - Open architectures, modular designs
  - Low risk and short developments
- **Demands stronger Govt skills**
  - Assessing technical maturity and risk
  - Proposal cost and schedule realism
  - Life cycle cost estimating

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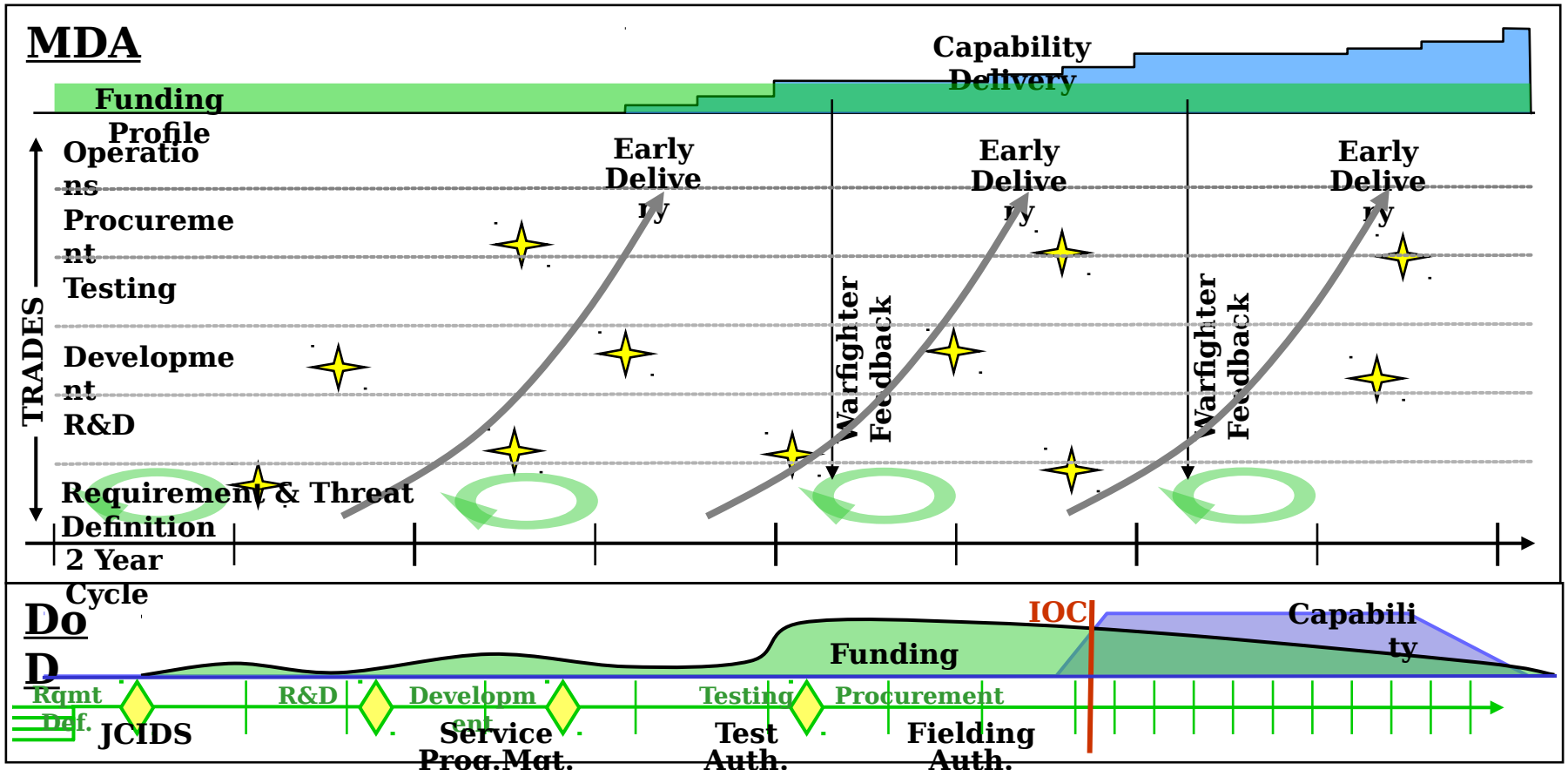
Capability Based Acquisition



Strengths

- *Fully Flexible Funding*
- *Combined Developmental & Operational Testing*
- *Integrated Capability Management*

Risks

- ***Transition To Services***

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Knowledge Points - Why

- **Problems occur because development programs do not capture early-on the requisite knowledge that is needed to effectively manage risks and make decisions**
- **Programs frequently disappoint**
  - Unrealistic cost and schedule estimates
  - Ill-defined and unstable requirements
  - Immature technologies
  - Constantly changing design & manufacturing processes
  - Such lengthy development times that better investment opportunities often emerge
- **As a result, programs require more resources and time than planned**

Knowledge Points are Our Hedge Against these Risks

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Knowledge Points – What They Are

- **Knowledge Point defined**
  - A preplanned event after which the decision-maker knows information for making key decisions
- **Unique to each program: Critical *risks***
  - Decision-maker decides what the knowledge points are
  - Data from knowledge points drives key decisions
    - Incremental financial commitments to a program
    - Schedule adjustments
    - Performance requirements
    - Program Continuation
    - Alternative or back-up path
  - Each added commitment to a program hinges on knowledge gained (confidence) about critical risks
  - Event-based: tests and demos based upon risks or known problems

Knowledge-Based Decisions Reflect a Fundamentally Different Way of Doing Business

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Knowledge Points
What They are Not

- **Routine ground or flight tests**
- **Program execution design reviews or assessments**
- **Simulation or wargame results**
- **Asset deliveries**
- **Documentation**
- **etc. . .**

These are Normal Events that Produce Neither <u>Critical</u> Knowledge nor Address <u>Significant</u> Risk

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Missing a KP Means the Viability of the Capability is in Jeopardy

- **Possible Outcomes of not Attaining a KP Might Include Technology remains promising, so alter approach**
  - Reallocate resources to scale back activity and concentrate on a particular aspect of the program
  - Cancel the program
  - Choose a new solution to address the requirement, i.e., cancel the program
  - Continue the program with caution
  - Changes in Personnel
  - …..
- **Attaining a KP is Absolutely Critical to "Program" Future**

Overall Results, Needs & Alternatives will Drive Outcomes

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Example of MDA Knowledge Points

- **Airborne Laser**
  - Knowledge Points Achieved
    - Demonstrated the ability to laze at significant power level and duration
    - Demonstrated that laser energy could be directed from an airborne platform
  - Outcomes
    - Achievement gave us confidence to designate ABL as primary boost capability
    - Delayed substantial investment until another major KP met: shooting down a ballistic missile in FY09
    - Based on remaining risks, continued to carry Kinetic Energy Interceptors as a hedge

The Above two Knowledge Points were Critical, Never-Before Demonstrated Events

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Example of MDA Knowledge Points

- **Kinetic Energy Interceptors**
  - Knowledge Points
    - Demonstrated accuracy and timeliness of the overhead imagery data to the fire control assets (2006)
    - Demonstrate required high acceleration boost rates through a flight test (2008)
  - Outcomes planned in FY09
    - Whether or not to continue the program, and
    - If continued, at what pace

Critical Events for Boost Phase Intercept

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Notional Knowledge Point Examples

- **Example A: Affordability uncertainty**
  - Seeker component
    - Seeker prototype provides confidence of added capability
    - Low yields fail to give confidence of affordable manufacture
  - *Approach*: We structure an affordability knowledge point *before* we begin the development spiral

- **Example B: Test failures**
  - Series of test failures show quality and workmanship issues in hardware manufacturing process
  - Contractor takes corrective actions, but we lack confidence in fix
  - *Approach*: We set up random hardware pedigree reviews and surprise manufacturing audits to gain data to give us confidence *before* we move forward with testing

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Notional Knowledge Point Examples (cont'd)

- **Example C: Technology Maturity**
  - Space-based interceptor (boost phase)
    - Requires light weight propulsion
    - Pump propulsion from Livermore shows promise
  - *Approach*: We build a prototype flight weight KV and verify performance *before* beginning development

- **Example D: Political Risk**
  - NATO countries are stakeholders in European GBI site
    - Collateral damage (debris, spent booster)
    - CONOPs
    - Defended areas
  - *Approach:* We reach a tentative agreement with NATO on CONOPs and other pertinent matters *before* we begin construction in host country

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Common Knowledge Point Attributes

- **Pre-planned**
- **Tied to “show-stopping” risk**
- **Real data to feed key decisions**
- **Future commitment depends on knowledge we gain**
- **Results in incremental development**
- **Decision-maker determines knowledge points**

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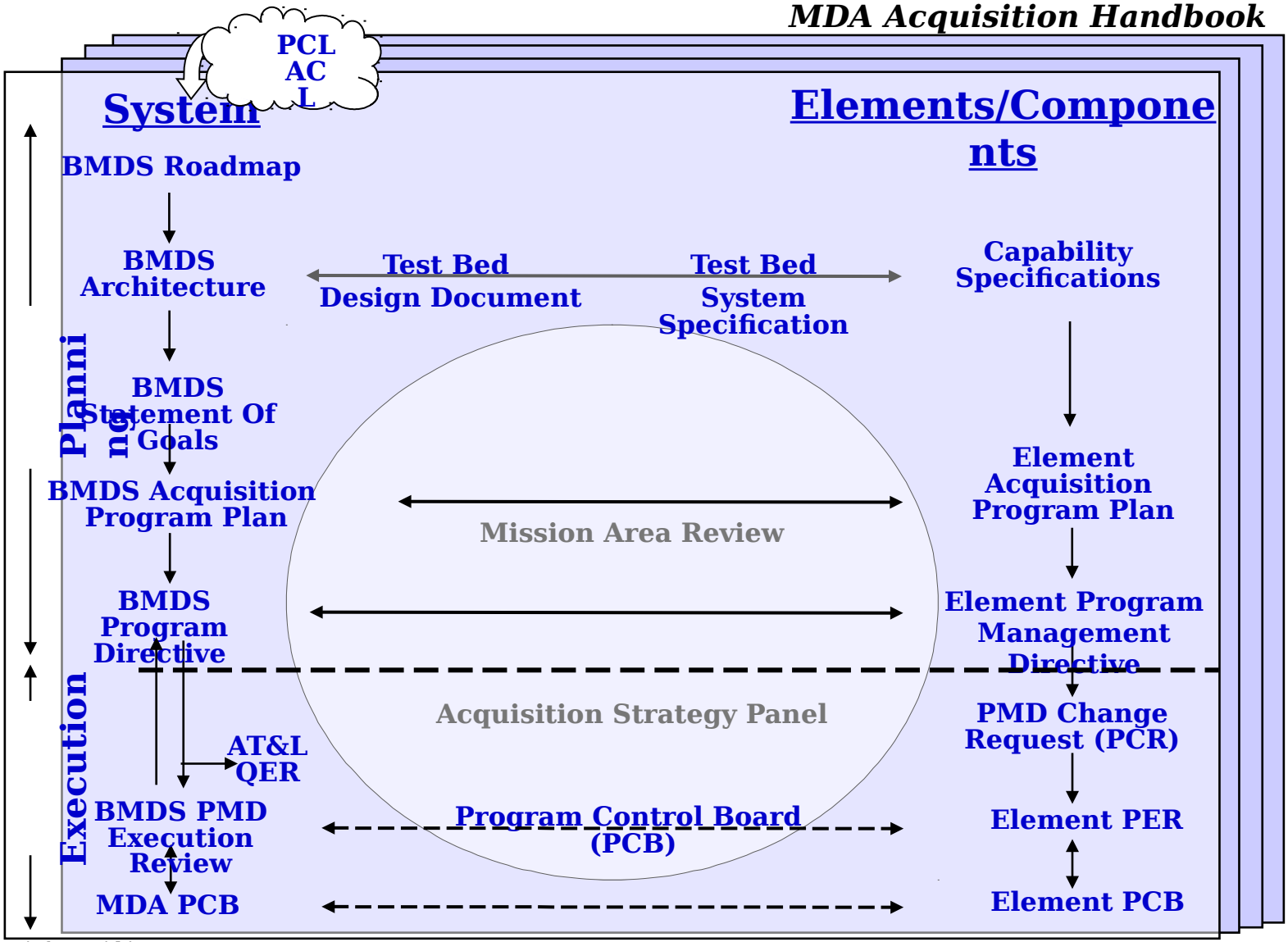
BMDS Acquisition Management - Framework



PCL – Prioritized Capabilities List

ACL – Achievable Capabilities List

QER – Quarterly Execution Review

PMD – Program Management Directive

PER – PMD Execution Review

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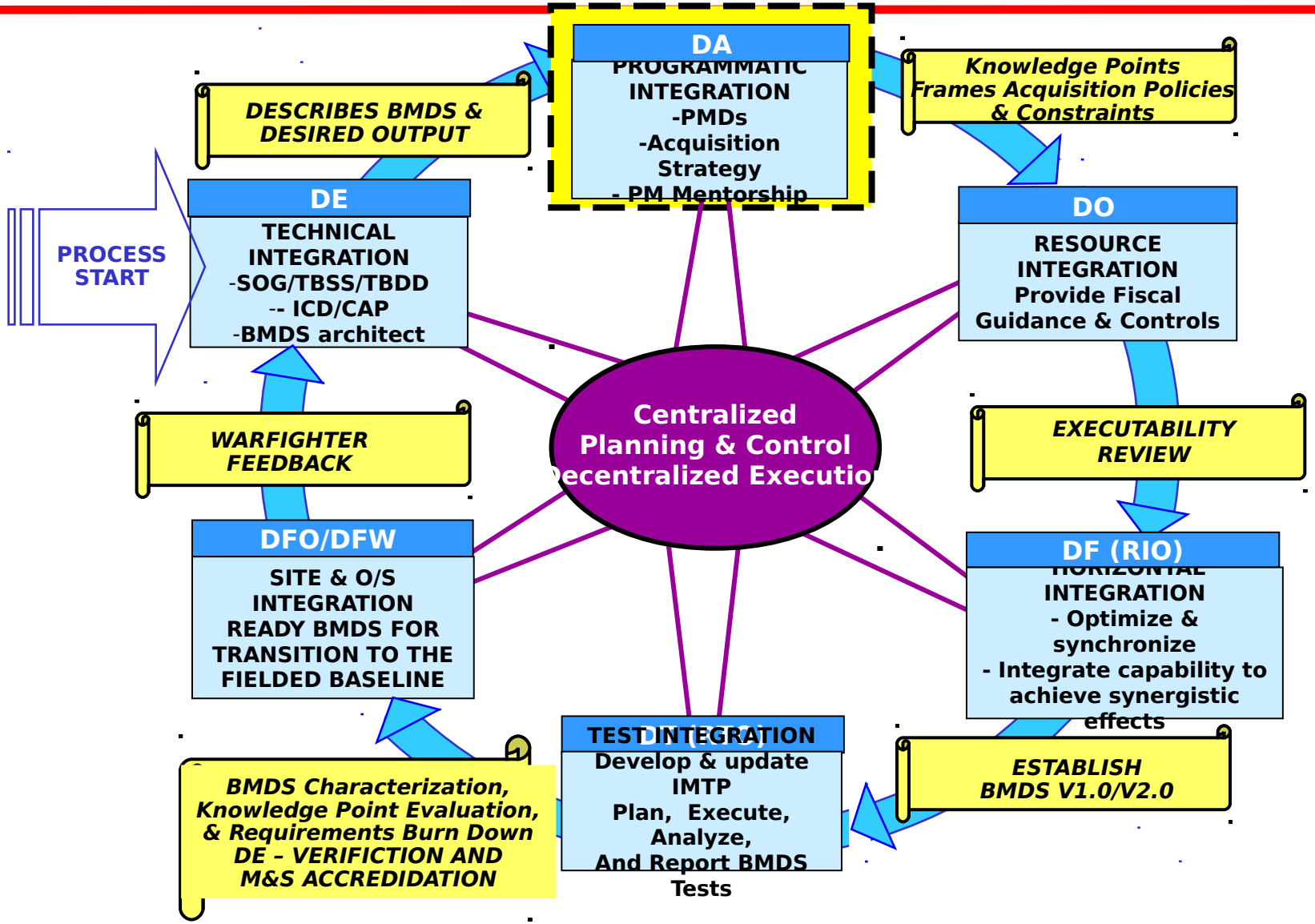
MDA Integration Process



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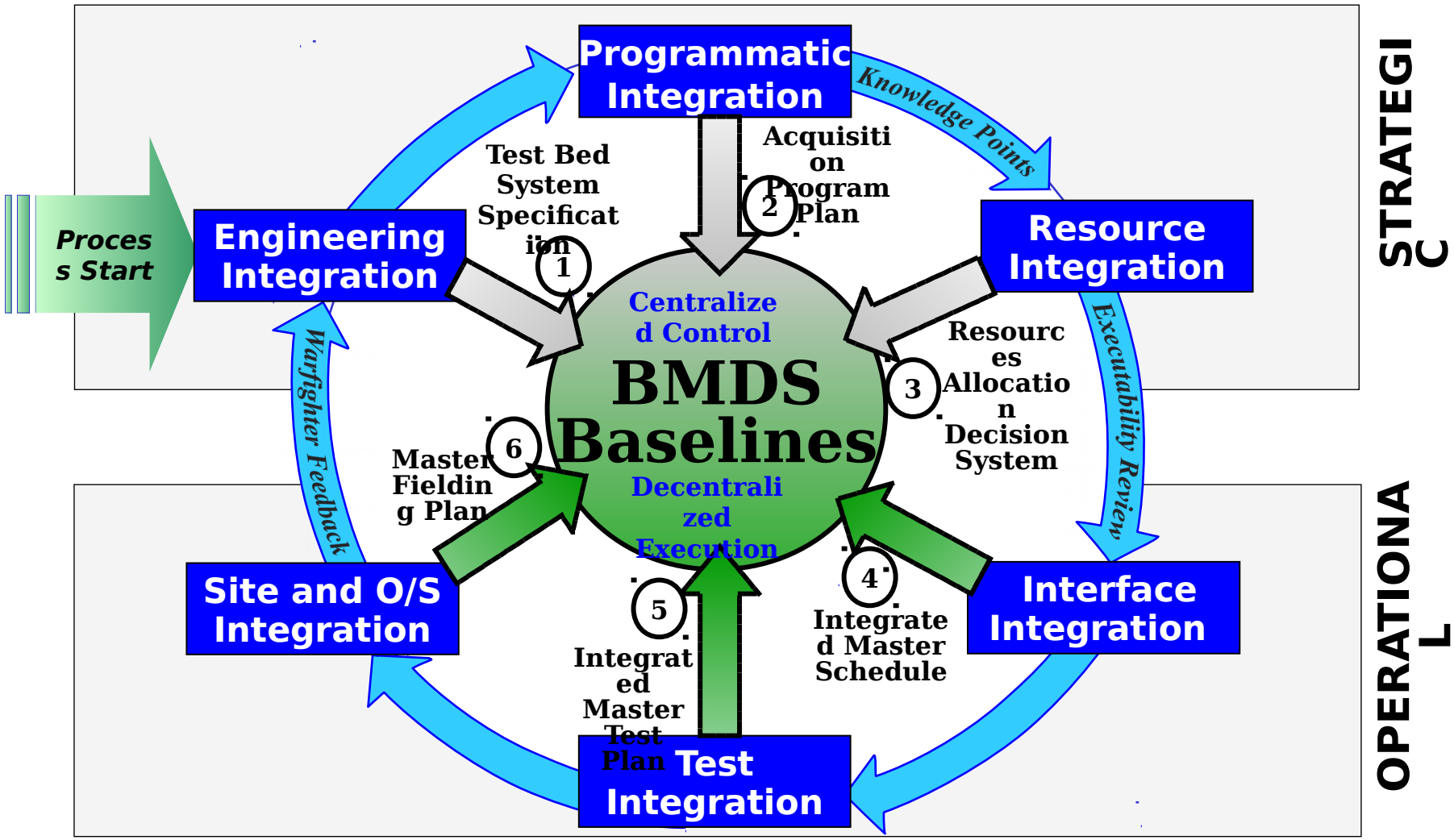
BMDS Baseline Management For Integrated BMDS



BMDS Baseline Components: 1 Technical 2 Contracts 3 Resource 4 Schedule 5 Test 6 Operational

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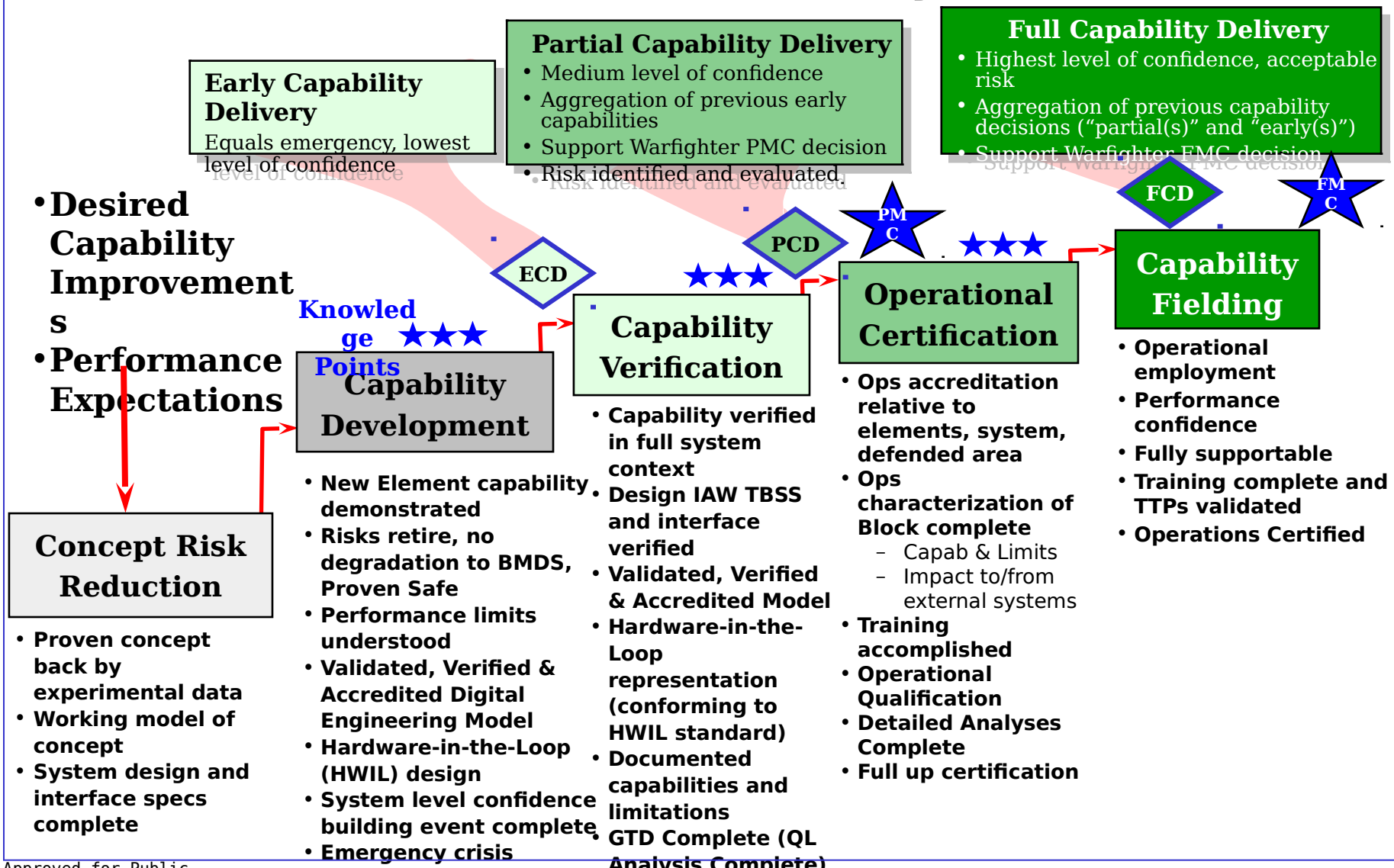
BMDS Baseline Management Evaluating Warfighter Delivery Capability


Early Capability Delivery
Equals emergency, lowest level of confidence
Partial Capability Delivery
• Medium level of confidence
• Aggregation of previous early capabilities
• Support Warfighter PMC decision
• Risk identified and evaluated
Full Capability Delivery
• Highest level of confidence, acceptable risk
• Aggregation of previous capability decisions ("partial(s)" and "early(s)")
• Support Warfighter PMC decision
• Desired Capability Improvements
• Performance Expectations
ECD
PCD
PMC
FCD
FMC
Knowledge Points
Concept Risk Reduction
• Proven concept back by experimental data
• Working model of concept
• System design and interface specs complete
Capability Development
• New Element capability demonstrated
• Risks retire, no degradation to BMDS, Proven Safe
• Performance limits understood
• Validated, Verified & Accredited Digital Engineering Model
• Hardware-in-the-Loop (HWIL) design
• System level confidence building event complete
• Emergency crisis response
Capability Verification
• Capability verified in full system context
• Design IAW TBSS and interface verified
• Validated, Verified & Accredited Model
• Hardware-in-the-Loop representation (conforming to HWIL standard)
• Documented capabilities and limitations
• GTD Complete (QL Analysis Complete)
• Warfighter & OTA
Operational Certification
• Ops accreditation relative to elements, system, defended area
• Ops characterization of Block complete
– Capab & Limits
– Impact to/from external systems
• Training accomplished
• Operational Qualification
• Detailed Analyses Complete
• Full up certification
Capability Fielding
• Operational employment
• Performance confidence
• Fully supportable
• Training complete and TTPs validated
• Operations Certified

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BMDS Baseline Management Warfighting Capability Delivery Definitions (Current)

Block 2008+

Early Capability Delivery
Equals emergency, lowest level of confidence

Block 2006

Partial Capability Delivery
- Medium level of confidence
- Aggregation of previous early capabilities
- Support Warfighter PMC decision
- Risk identified and evaluated

Block 2004

Full Capability Delivery
- Highest level of confidence, acceptable risk
- Aggregation of previous capability decisions ("partial(s)" and "early(s)")
- Support Warfighter FMC decision

- **Desired capability improvements**
- **Performance expectations**

Knowledge Points

ECD

PCD

PMC

FCD

FMC

Concept Risk Reduction
SM-3 Blk 1b
MKV

Capability Development
Sea-Based Terminal
KEI
ABL
CR-2
THAAD
STSS
C2BMC 6.4
SBX
Fylingdales
GFC 6a

Capability Verification
C2BMC 6.2
GBI

Operational Certification
Aegis BMD 3.6
Cobra [illegible]
SM-3 Blk 1a
AN / TPY-2 #2
GFC 4b

Capability Fielding
PAC-
DSP
C2BMC 6.0
SM-3 Blk 1

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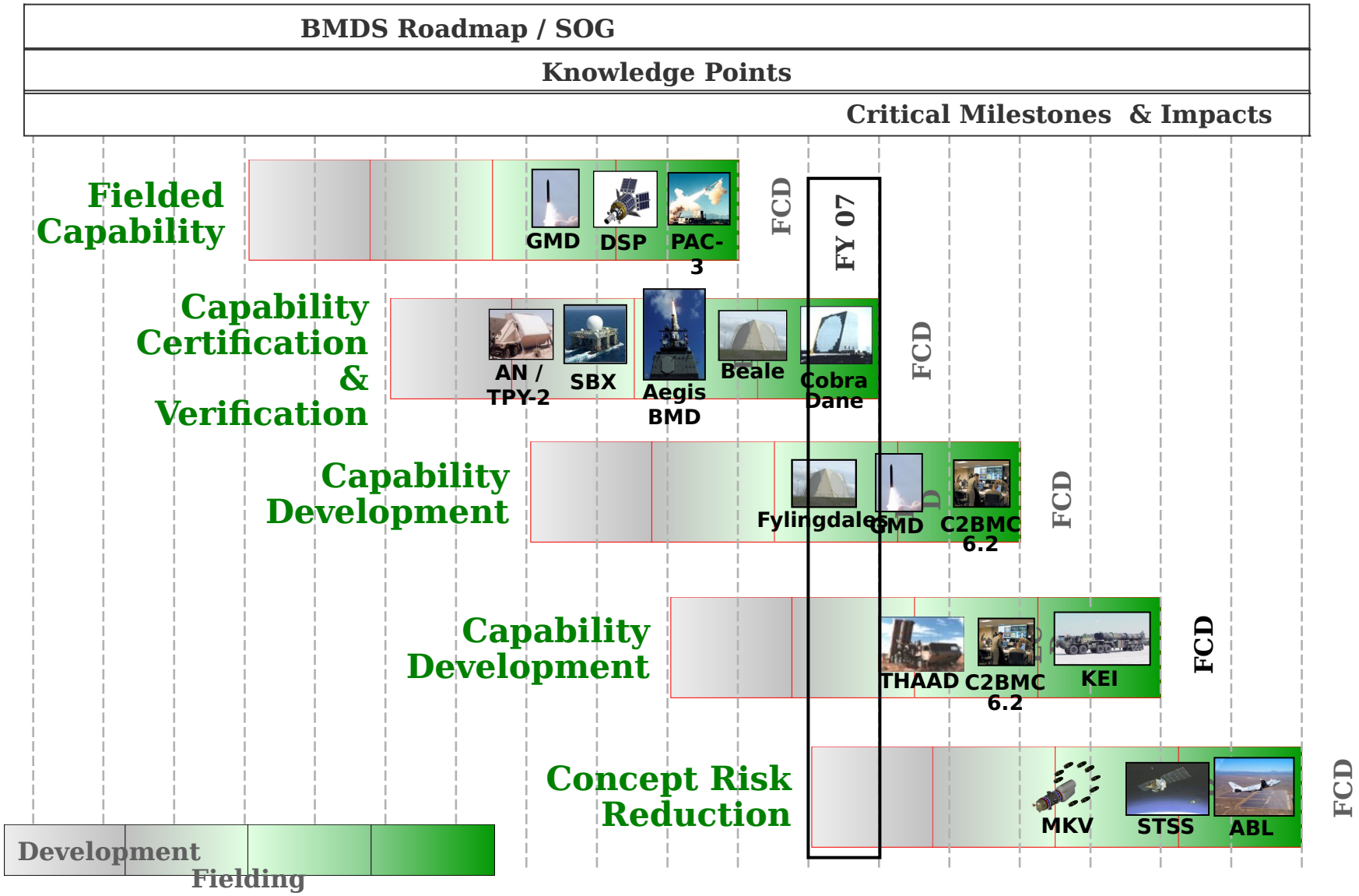
Developing & Delivering The BMDS



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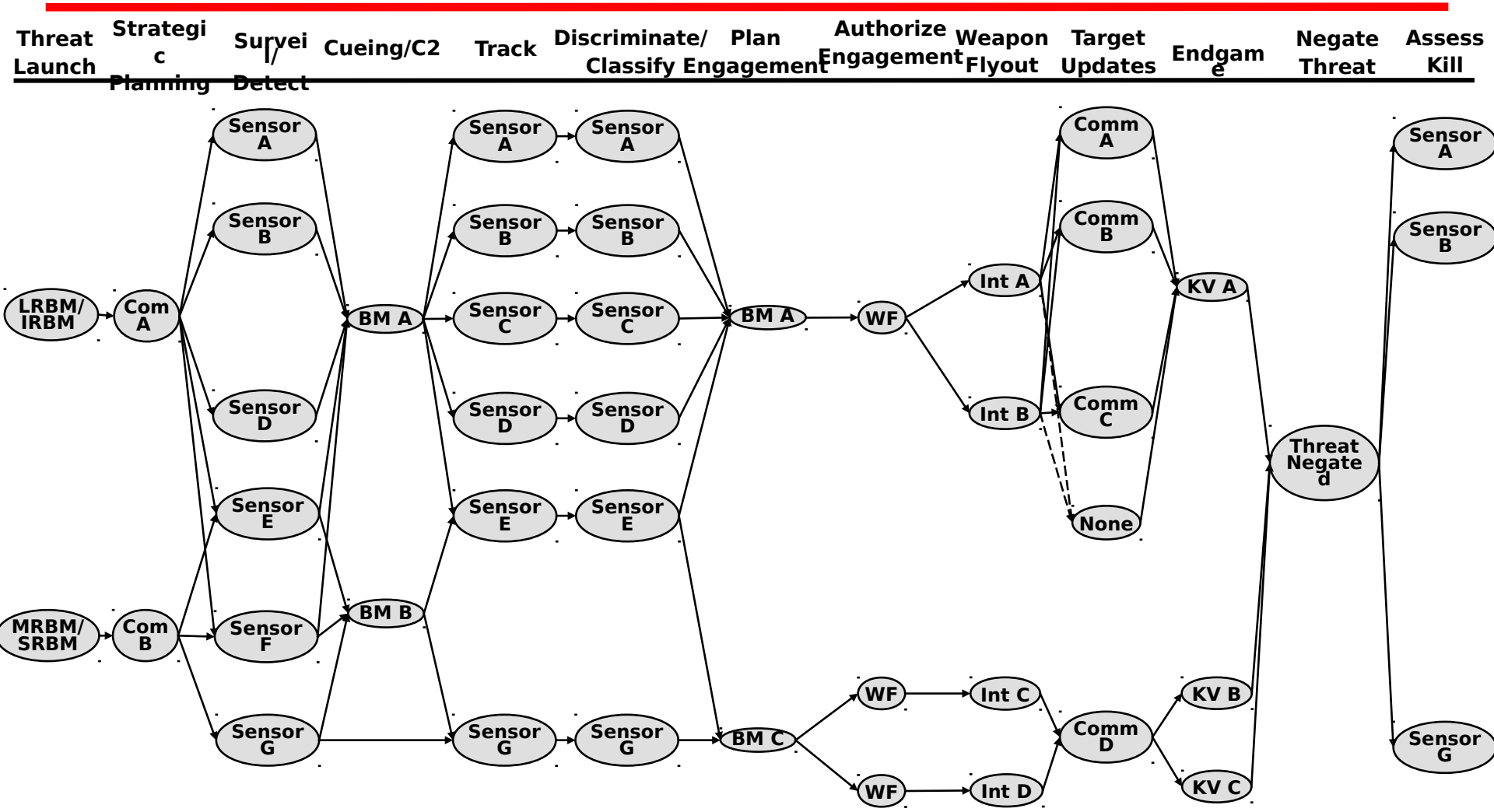
Notional BMDS “Kill Web”



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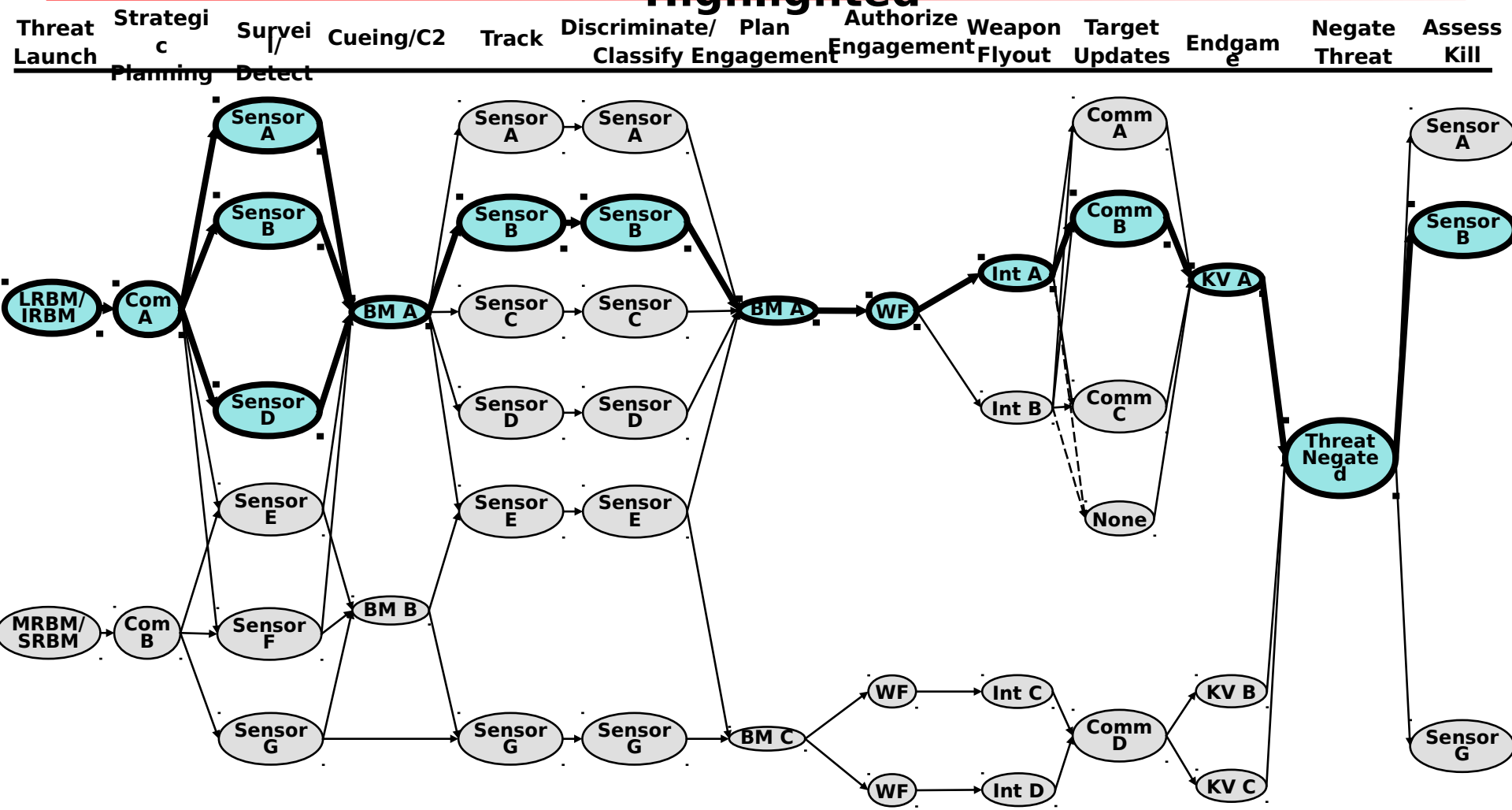
Notional BMDS "Kill Web"

"Interceptor A Launch on Sensor B" ESG Highlighted



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NEW BOOSTER
(Hypothetical Example To Illustrate Framework)

- **BMDS Roadmap (Options Considered Over Twenty Year BMD Projection)**
  - Pursue Space-based Defense (Stop GMD Development)
  - Pursue New Terrestrially-based Development To Replace Current GMD
  - Rely On Fielded GMD, Increase Inventory, And Upgrade Components
- **BMDS Architecture Decision To Pursue Third Alternative:**
  - Goal Established For New Booster (Replacing GBI) In Block 12
- **GMD Capability Specification**
  - BMDS Performance Requirements Include New Booster (E.G. Mobility)
- **BMDS SOG**
  - Development SOG Captures System & Element Goals For New Booster In Block 12
- **BMDS Acquisition Program Plan**
  - System-level Knowledge Point (SKP) 1: Successful Booster Demonstration In CY 08
  - SKP2: Booster/KV Integrated Ground Test (Nominally In CY 10)
  - SKP3: Interceptor Flight Test Demo (Nominally In CY 13)
  - BMDS Schedule, Funding, Acquisition Strategy Include Component Improvement

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NEW BOOSTER
(Example Continued)

- **Element Acquisition Program Plan:**
  - Program Of Work
  - Complete Design / Build Prototype
  - Component Tests / Simulations (Element-level Knowledge Points)
  - Subsystem Integration; Integration With BMDS; Assessment
  - Schedule And Cost
  - Acquisition Strategy (Contract Type, Incentives, Competition, Etc.)
  - RADS Work Packages Updated For Booster Work
- **BMDS PD**
  - Updated To Direct Revised BMDS Acquisition Program Plan To MDA/DF To Execute
- **Element PMD**
  - GMD Determines What New Program Direction Is Required
  - PCB Program Change Request Is Initiated To Update GMD PMD
- **SER**
  - GMD Reports Progress Against Revised PMD

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TRANSITION TO OPERATIONS

- **Early Capability**
  - Operations entry point for new, immature components/capabilities
  - Lowest level of confidence, contingency/emergency ops only
- **Partial Capability**
  - Medium level of confidence, based on tests & analyses
  - Aggregation of previous early capabilities
  - Risks identified and evaluated
  - Logistics support adequate to support operations
  - Support warfighter PMC decision
- **Full Capability**
  - Highest level of confidence, sufficient BMDS-level tests
  - Aggregation of previous capability decisions (“partial(s)” and “early(s)”)
  - Sufficient performance/logistics for sustained defensive ops
  - Support warfighter FMC decision

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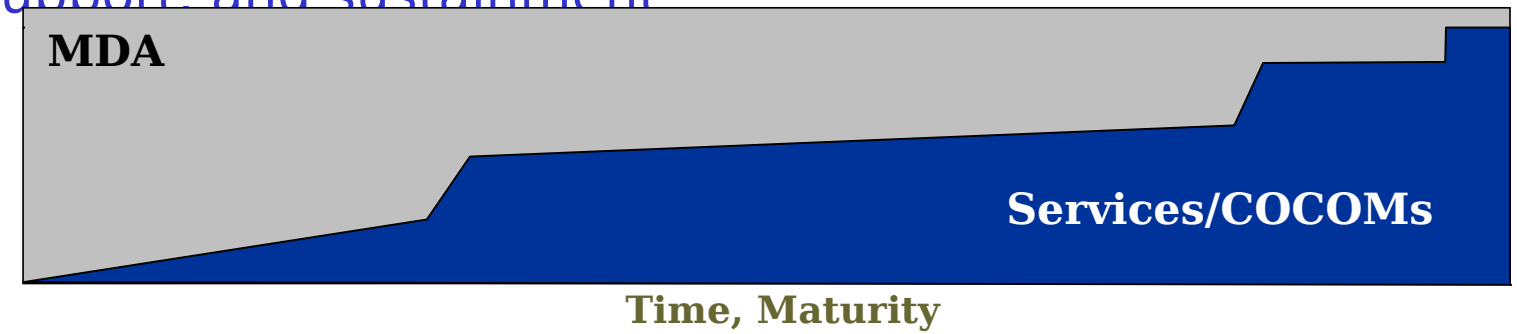
Transition and Transfer Spectrum Ranges

- **Transition*:** During the development phase, particularly when a component is deployed under contingency fielding, or emergency fielding conditions the Lead Military Department is responsible for providing for operation and support. Physical possession of BMD mission equipment is retained by MDA until the program office transfers
- **Transfer*:** Conveying the possession of an item or responsibility from one entity to another. Transfer includes the roles and responsibilities for procurement, operations, support, and sustainment



MDA Retains Configuration Management Responsibilities

From the USD (AT&L) Approved 2006 Transition and Transfer Plan

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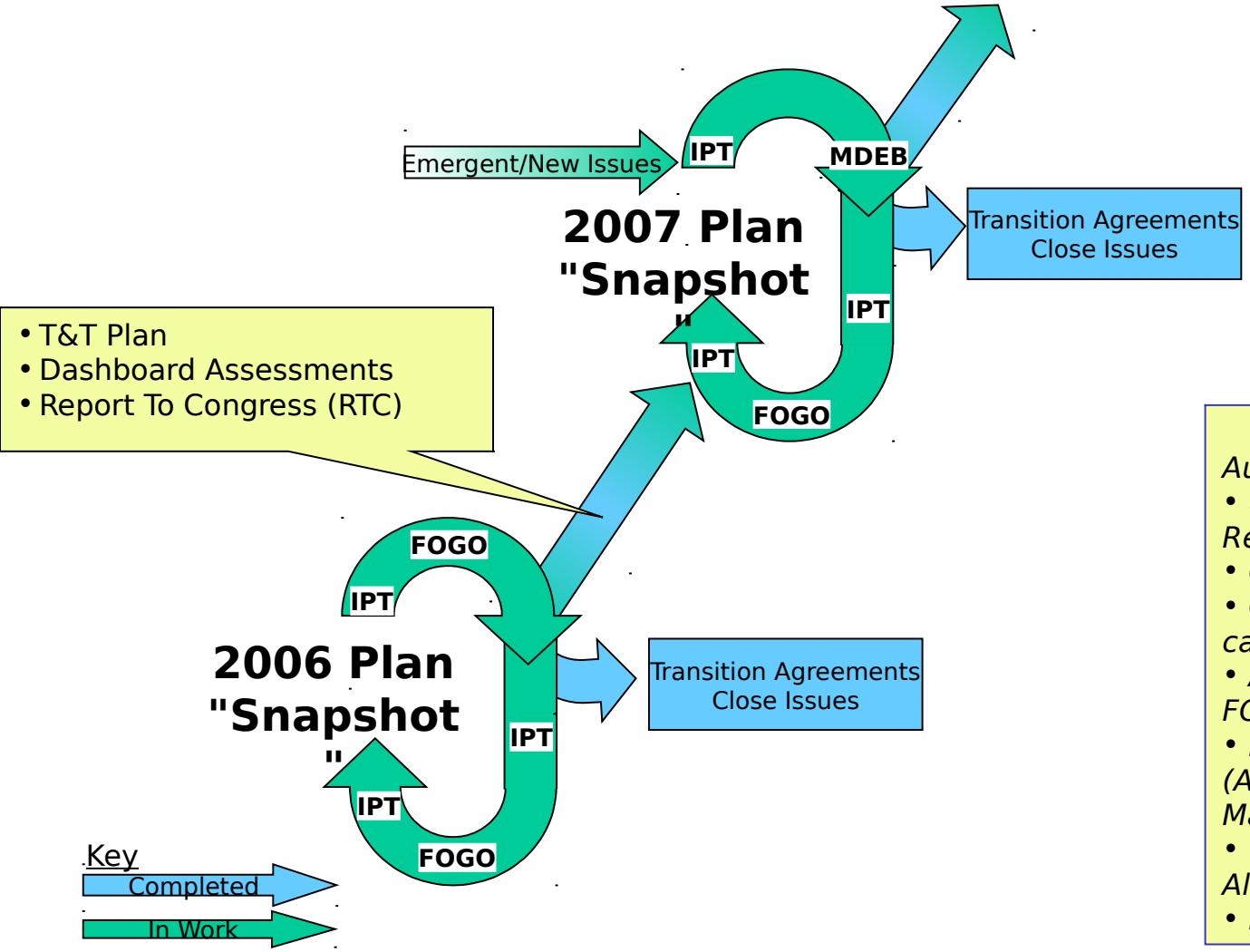
TRANSITION AND TRANSFER PROCESS



Annual T&T Plan

- *Directed by DUSD (A&T) annually - MDA develops and submits*
- *Source document for Annual RTC*
- *Snapshot across each current and future blocks*
- *Budget and funding Decision cycle focus across future POMs*
- *Captures issues in work/reports those solved*

August - March:

- *Update Roles and Responsibilities*
- *Call for Issues*
- *Call for New Transition candidates*
- *Address issues via WGs, IPTs, FOGOs, BoDs, JBoDs, MDEBs*
- *Build Plan and RTC for USD (AT&L)*

March – August:

- *Work Issues/Agreements*

All Times

- *Dashboard Assessment*

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TRANSITIONS FROM/TO SERVICES

- **JAN 02 – SECDEF established MDA and provided guidance on transitions and transfers (T&T)**
- **FEB 02 – T&T Plan requested by USD(AT&L)**
- **DEC 02 – The President directed system fielding by 2004**
- **AUG 04 – MDA response to GAO on GM transition**
- **OCT 04 – MDA Charter, DoDD 5134.9 directs MDA to:**
  "…develop plans, in conjunction with Secretaries of Military Departments,…for BMDS Element(s)

T&T Effort is anchored in Higher Level Requirements

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Material Transition and Transfer Process

		Missile Defense Executive Board (MDEB)					
Element Capability (unless otherwise prescribed)	**Date of MDA Transition Planning**	**Lead Mil Dpt Decision (DepSecD**	**Status of Agreement (None, Draft, Coordinate, Complete)**	**Date of Signature**	**Proposed or Actual Transition Date (FY)**	**Transition Capability Delivery Completed**	**Transfer-Mil Dpt Element Capability Management Agreement Date (FY)(10 USC 224b)**
A. THAAD (2FU)	2006	Army 2006	Draft		2009		
B. Aegis BMD Blk 04	2006	Navy 2006	Complete	9 Mar 07	2008	FY10 (Agreed to conditions are met, e.g. Rnds delivered)	
C. UEWR	2006	Air Force 2006	Draft		2009/2011		
D. CDU Capability and PMO	2006	Air Force 2006	Draft		2008		
E. AN/TPY-2	2006	Army 2006	Draft		2010		
F. SBX	2006	Navy 2007	Draft		2014		
G. GBI/GFC	2006	Army 2006	Ltr to Army-proposed strategy for transition		2014		
H. C2BMC (No Lead SVC	2006	MDA Retains	N/A		N/A	N/A	N/A
I. STSS	2006	Air Force 2006	None		Beyond FYDP		
J. ABL	2006	Air Force 2006	None		Beyond FYDP		
K. Not Used							
L. PAC-3	2006	Army Gained 2003	Complete		N/A	N/A	N/A
M. SBIRS	2006	Air Force	Complete		N/A	N/A	N/A
N. EMR	2007		None				

= Potential future action
Date Future action with possible date/cmt
= See notes, or Not Applicable (N/A)
= On track for capability transition and/or program transfe
= Insufficient progress
= May delay delivery, but on track (issues being worked)

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07-MDA-2550 (15 May

Operational Transition and Transfer Planning Enablers

MDA's Development

DOTMLPF Areas

	Planning																
	MDA Lead Development / Military Department Support										Military Department Leads O&S / MDA Supports						
Element Capability	**Security**	**CARD**	**Logistics**	**Engineering**	**Testing**	**Contracting**	**EOD**	**FOD**	**Safety (QC)**	**POM**	**Doctrine**	**Organization**	**Training**	**Leadership**	**Material**	**Personnel**	**Facilities**
A. THAAD (2FU)		May 06															
B. Aegis BMD Blk 04		May 06															
C. UEWR		May 06							TBD								
D. CDU		May 06							TBD								
E. AN/TPY-2		TBD		TBD					TBD								
F. SBX		May 06							TBD								
G. GBI/GS		May 06							TBD								
H. C2BMC (N Lead SVC		Nov 07							TBD								
I. STSS		May 06							TBD								
J. ABL		Nov 07							TBD								
K. Not Used																	
L. PAC-3	N/A	N/A	N/A			N/A	N/A	N/A	TBD								
M. SBIRS	N/A	N/A	N/A			N/A	N/A	N/A	TBD								
N. EMR																	

= Complete/expected completion = Working issues = Insufficient progress/Risk

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Summary

- **Truly implementing Capability Based Acquisition**

- **Luxury of Focused Portfolio Management**

Proven Success!
Warfighter Capability Rapidly Delivered!

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International Activity Highlights

Framework Partners

Japan: Forward-based X-Band radar siting, 21" Missile Development

UK: Fylingdales UEWR, lethality studies system-level analyses, advanced technology programs, target development

Australia: Science and technology cooperation

Denmark: Upgrade Thule Early Warning Radar, Technology Discussions

Italy: Framework MOU signed, MEADS partner, architecture analysis study

Continuing Activity

Israel: Arrow Deployed, Arrow System Improvement Program

Germany: MEADS Partner, Laser Cross-Link Technology

Netherlands: PAC-3, Trilateral Frigate Program Maritime Cooperation

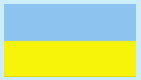
NATO: Active Layered Theater BMD – System Engineering and Integration

New Relations / Emphasis

Spain: U.S. -Spain Missile Defense Technical Group established

Poland: Missile Defense Consultations and Workshops; expressed interest in hosting missile site

Czech Republic: Missile Defense Consultations; expressed interest in hosting midcourse radar



Ukraine: Exploring possible cooperative projects

India: Missile Defense Discussions and Workshops ongoing

Russia: Theater Missile Defense Exercise Program

France: Exploring interest

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